

## Course Descriptions for CBC Graduate Courses

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**828. Radioisotopic Methods** (BIOS 428/828)(2-3 cr I) Lec 2, lab and quiz 3. Prereq: CHEM 106 or 110, PHYS/ASTR 142, and Math 101 (106 recommended), or permission. Theoretical aspects and practical applications of radiotracer methodology in biochemical, biological, and agricultural research. With permission by the instructor the lab may be waived, for 2 cr.

**831. Biomolecules and Metabolism** (CHEM, BIOS 431/831) (4 cr I, II) Lec 4. Prereq: CHEM 252 or 262. BIOS 102 recommended. First course of a two semester, comprehensive biochemistry course sequence. Structure and function of proteins, nucleic acids and carbohydrates; nature of enzymes; major metabolic pathways; and biochemical aspects of molecular biology. Completion of BIOC 432/832 following this course is recommended. Suitable for biochemistry study in pre-professional and graduate programs.

**832. Gene expression and replication** (CHEM, BIOS 432/832) (2 cr I, II) Lec 2. Prereq: BIOC 431/831. A continuation of BIOC 431/831. Structural and biochemical aspects of DNA replication and gene expression, and biotechnology.

**833. Biochemistry Laboratory** (CHEM, BIOS 433/833) (2 cr I, II) Lec 1, lab 4. Prereq: BIOC 431/831 or concurrent enrollment. An introduction to techniques used in biochemical and biotechnology research, including measurement of pH, spectroscopy, analysis of enzymes, chromatography, fractionation of macromolecules, electrophoresis and centrifugation.

**834. Plant Biochemistry** (AGRO, BIOS, CHEM 434/834)(3 cr, II) Lec 3. Prereq: BIOC 431/831 or the equivalent. Biochemical metabolism unique to plants. Relationships of topics previously described in general biochemistry to biochemical processes unique to plants. Biochemical mechanisms behind physiological processes discussed in plant or crop physiology.

**836. Biophysical Chemistry** (CHEM, BIOS 436/836) (3 cr II) Lec 3. Prereq: one semester of physical chemistry or permission. An introductory course covering: X-ray diffraction and protein structure. Absorption spectroscopy of biomolecules, linear and circular dichroic spectroscopy of proteins and nucleic acids. Fluorescence probes, membrane dynamics, NMR, EPR, and Resonance Raman spectroscopy applied to biological systems. Energetics, enzyme kinetics, relaxation kinetics, allosteric systems, and hydrodynamics.

**837. Research Techniques in Biochemistry** (BIOS 437/837)(4 cr II) Lec 1 lab 9. Prereq: CHEM 116 or 221 and BIOC 433/833, or permission. Practical applications of biochemical methodology to studies in the life sciences. Hands-on experience with quantification by spectrophotometry and spectrofluorimetry, chromatographic and electrophoretic fractionation of proteins and nucleic acids, detection of biomolecules by immunological and DNA hybridization techniques, and analysis of data with a microcomputer. For advanced undergraduate and beginning graduate students who plan a career in laboratory work within the life sciences.

**886. Advanced Topics in Biophysical Chemistry** (BIOC, BIOS 486/886)(3 cr II) Lec 3. Prereq: CHEM 471/871 or 481/881. Applications of thermodynamics to biochemical phenomena, optical properties of proteins and poly-nucleotides, and kinetics of rapid reactions.

**838. Molecular Biology Laboratory** (BIOS, VBMS 838) (5 cr III) Lec 6 lab 27. Lab fee: \$15.00. Prereq: BIOC 432/832, BIOS 312, BIOS 313, an advanced course in genetics and permission. Basic techniques for bacteriophage and plasmid molecular cloning; dideoxy DNA sequencing. Students may use a gene of their own interest if they have a suitable probe.

## Biochemistry Courses

**839. Graduate Survey of Biochemistry** (CHEM, BIOS 839) (4 cr I) Lec 4. Prereq: Graduate standing in Biological Chemistry, Chemistry or Biological Sciences or permission. A comprehensive survey of biochemistry for incoming graduate students. Topics to be covered include those in BIOC 831 and 832, but not all topics will be discussed in lecture periods. Depth enhanced by assigned readings.

**898. Research in Biochemistry** (1-6 cr I, II, III) Prereq: BIOC 433/833 and permission. Laboratory research of a specific problem under the supervision of a Biological Chemistry faculty member. 899. Masters Thesis (Biological Sciences 899) (6-10 cr I, II, III) 915Q. Graduate Seminar in Molecular Plant Biology (Biological Sciences 915Q) (1 cr per sem. I, II) Prereq: Graduate Standing and permission.

**930. Seminar in Biological Chemistry** (CHEM, BIOS 930) (1-2 cr, I, II). Prereq: BIOC 432/832 or 839 and permission.

**932. Proteins** (CHEM, BIOS 932) (3 cr) Lec 3. Prereq: BIOC 432/832 or 839, or permission. Classification, composition, purification and function of proteins.

**933. Enzymes** (CHEM, BIOS 933) (3 cr) Lec 3. Prereq: BIOC 432/832 or 839, or permission. Kinetics, regulation and reaction mechanisms of enzymes.

**934. Nucleic Acids** (CHEM, BIOS 934) (3 cr II even years) Lec 3. Prereq: BIOC 432/832 or 839 or permission. Structure and function of nucleic acids and nucleoproteins. Assessment of current research in nucleic acid biochemistry.

**935. Intermediary Metabolism** (CHEM, BIOS 935)(3 cr I, even years) Lec 3. Prereq: BIOC 432/832 or 839 or permission. Integration of major metabolic pathways. Bioenergetics and control mechanisms for catabolic and anabolic processes.

**937A. Advanced Topics in Plant Biochemistry: Photosynthesis and Related Processes** (CHEM, BIOS 937A) (3 cr, offered every fourth semester) Lec 3. Prereq: permission. A journal-based advanced coverage of biochemical and biophysical aspects of photosynthesis, stomatal function, translocation and mitochondrial respiration in higher plants.

**939. Photobiochemistry** (CHEM, BIOS 939) (2 cr II, even years). Lec 2. Prereq: 1 yr biochemistry and physics. Biochemical effects caused by the interaction of light and living matter. Systems to be covered will include microbes, animals and plants.

**949. Biochemistry of Nutrition** (BIOS 949) (3 cr I odd years) Lec 3. Prereq: BIOC 432/832 or 839 or permission. Interrelationships of nutrients, nutritional state and metabolic processes will be explored. Special emphasis will be given to energy metabolism, integration of nutrition and metabolism and nutritional regulation of gene function.

**998. Advanced Topics in Biochemistry** (1-3 cr, arranged). Prereq: BIOC 432/832 or 839. The presentation of special biochemistry topics when faculty interests and student needs cannot be met by other graduate level courses.

**999. Doctoral Dissertation** (BIOS 999) (Cr arr. I, II, III)